

# User Manual

## Wide Dual Band Booster



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Information in this manual is subject to change without notice

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### Important Notice:

**Don't power on Power supply for repeater before donor and service antenna connects to repeater.**

## 1 Description

The wide band booster (PODRP23) is a bi-directional amplifier used to enhance signals between a mobile and a base station. This repeater type is used for digital telecommunication system:

- 1) -It picks up the strongest signal from BTS via the Donor Antenna,
- 2) -Linearly amplifies the signal and then retransmits it via the Indoor Signal Distribution System to the weak/blind coverage area.
- 3) -And the mobile signal is also amplified and retransmitted to the BTS via the opposite direction.



It features with customized frequency band, flexible installation, cost-effectiveness and ideal coverage solution, its output power varies from 20dBm to 23dBm.

It is applied to small, medium-size areas such as home, offices, shops, and basements, remote countryside , and mining well etc.

This model booster is commonly used in situations where large numbers of frequency carriers are to be repeated or when base station synthesized frequency hopping is used.

This model booster does not separate out specific carriers but amplify and retransmit all signals within a defined frequency band. Inter-modulation distortion caused by band selective repeaters usually means that lower output power per carrier can be realized compared to channel selective repeaters.

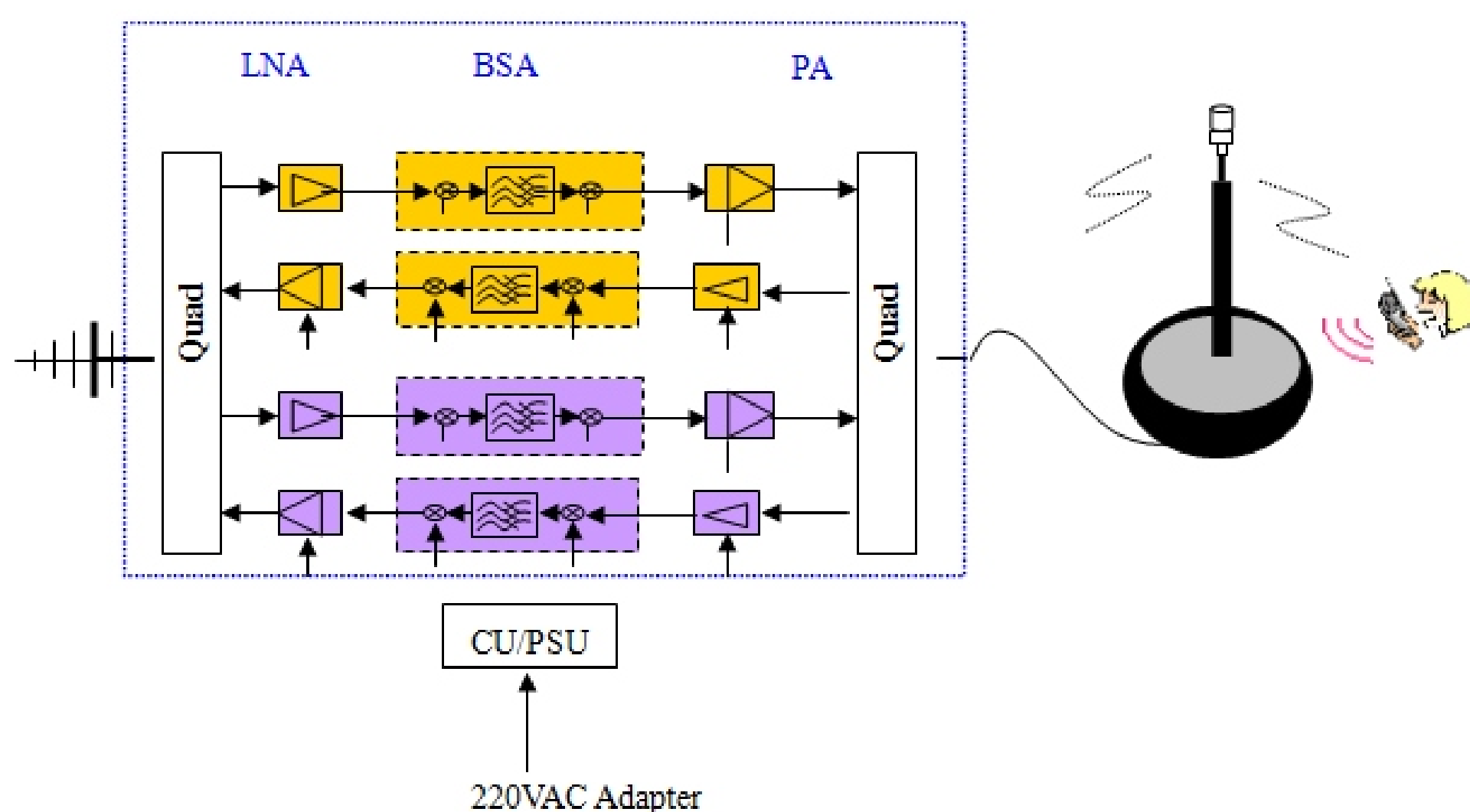
## 2 Technical Specifications

		Band A	Band B
Network(Customized)		Any two bands of 800/850/900/1800/1900/2100	
Gain	Uplink	60±2dB	60±2dB
	Downlink	65±2dB	65±2dB
Output Power	Uplink	17±2dBm	17±2dBm
	Downlink	20±2dBm	23±2dBm
Gain Adjust Scope		MGC≥30	
Gain Adjust Step		1dB	
Gain Adjust precision		0 ~ 10dB/±1dB#10 ~ 20dB/±1.5dB#20 ~ 31dB/±2dB	
Band Ripple		±4	
ALC Scope		20dB	
Frequency Error		≤±0.05	
I/O Impedance		50Ω/N connector	
VSWR		≤1.5	
Noise figure		≤8	
Spurious Emission		≤-36dBm@9KHz ~ 1GHz/≤-30dBm@1 ~ 12.75GHz	
IM3		-40dBc	
Delay		≤0.5μs	
Max Input Power Level(1minute)		-10dBm	
RF Connector		N-Type (Female)	
Temperature Range		Operation: -25°C ~ + 55°C;Storage: -30°C ~ +60°C	
Relative humidity		5~95% RH	
Power consumption		50W	
Power Supply		AC220V	
Power Supply(Customized)		AC/110V±10% 60Hz	
Power Supply Socket(Customized)		Connector Type B	
Dimension (mm)		150×120×22mm	
Weight(kg)		0.6kg	
Shipment Dimension (mm)		240×160×50mm	
Shipment Weight(kg)		0.8 kg	
Indicator	DC LED	Light @ Power supply on	
	RUN LED	Light @ Working	
	<div><div><div>BS</div><div><div><div>LED (RUN)</div><div>LED(DC)</div></div><div>DC 5V</div><div>MS</div></div></div></div>		



### 3 System Diagram

The RF link (donor) towards the base station is typically fed from an outdoor antenna while the coverage area is fed by an indoor antenna



The RF link (donor) towards the base station is typically fed from an outdoor antenna while the coverage area is fed by an indoor antenna or connected to mobile antenna directly.

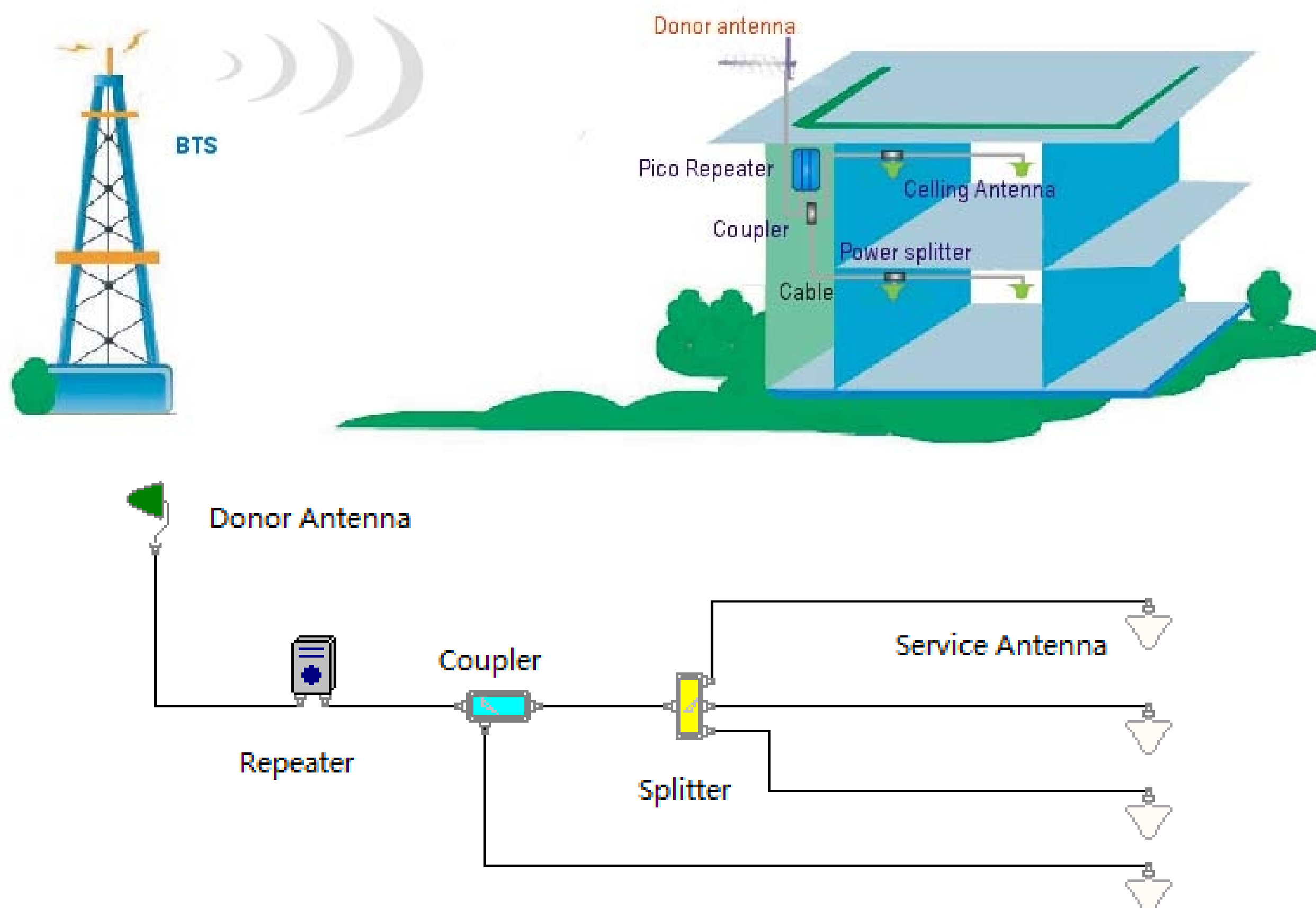
The signal from the base station is received via directly antenna, then forwarded through a duplex filter, is amplified in a low noise amplifier (LNA), enters the RF filter for wideband selective, and then amplified in the power amplifier.

The output signal passes a duplex filter, before it is fed to mobile or indoor antenna which retransmits the signal to the aim areas.

### 4 Product Features

- High system **gain>65dB**, High system output **power>20dBm**
- Light weight, small dimensions, easy to install
- Smart Automatic Level Control (**ALC**) to reduce interference to BTS
- **Linear** power amplification to effectively suppress inter-modulation and spurious emission
- An alarm interface with unique **color LEDs** to indicate power supply and signal level of uplink and downlink
- Simple installation with external **AC/DC adapter**
- Dual ports and **full duplex design**

## 5 Applications Example



The repeater coverage area size depends on output power of repeater

- 1) Repeater output power= repeater input power + gain;
- 2) If repeater work at full output power, it require the input power=  $20(\text{output power}) - 65(\text{gain}) = -35\text{dBm}$ ;
- 3) For 850/1900 dual band repeater, the donor antenna direction must be adjustment angle by angle, so the dual band input power require good signal at the same time , then 850 and 1900 can work with maximum coverage area and distance.

### Notices:

- 1) The signal strength (includes donor antenna) from donor BTS must be 5dB larger than from neighbor BTS lists and signal level  $> -50\text{dBm}$ , so the repeater can amplifier in high efficiency with full output power.
- 2) The donor antenna should have line of sight (LOS) with the BTS antenna. If the signal strength is adequate, LOS may in some cases not be necessary.

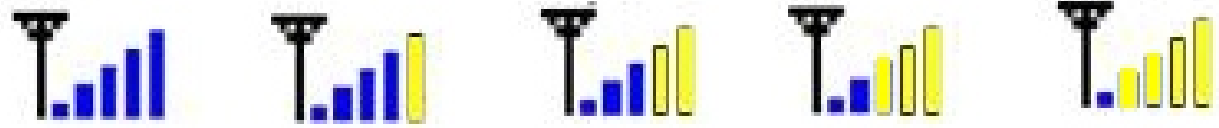
- 3) Donor antenna gains are typically 9 to 14 dB, and have a horizontal and vertical beam width of less than 30° to correctly select the donor BTS.
- 4) There is large physical separation between the antennas in order to prevent degradation of signal quality and risk of oscillation (Antenna isolation). Ways to achieve this can be usage of highly directional antennas with good front-to-back interference ratio or external shielding between the antennas (For example, your building has a metal roof and you install the Donor antenna above the roof and the Coverage antenna below the roof.). Another option is to use a Frequency Translating Repeater or ICS repeater.

### 5.1 Minimum Signal Levels

You must have a minimum signal level in the place where you would install the Donor antenna. Failure to provide sufficient input signal will only result in a poor coverage inside the building for this repeater system.

### 5.2 How to check your signal levels

To check your signal levels, use the phones in the place where antenna be install (on the roof) and observe the signal bars on the phone. It is also helpful to be on a call for immediate registration of the signal/reception. Carefully walk around the roof with the phone to see where the signal is best. The Donor (outside) antenna should be placed in the location where you get the most signal.

	5 Bars	4 Bars	3 Bars	2 Bars	1 Bars
					
NOKIA	NONE	>-85dBm	-85~-90dBm	-90~-95dBm	-95~-100dBm
Anycall	>-85dBm	-85~-90dBm	-90~-95dBm	-95~-100dBm	-100~-105dBm
Motorola	>-80dBm	-80~-90dBm	-90~-95dBm	-95~-100dBm	-100~-105dBm
Simens	NONE	>-70dBm	-70~-80dBm	-80~-90dBm	-90~-100dBm
Errison	>-75dBm	-75~-85dBm	-85~-90dBm	-90~-95dBm	-95~-105dBm
SAGEM	>-80dBm	-80~-90dBm	-90~-95dBm	-95~-105dBm	-110~-105dBm



It is important to investigate and understand what is causing your reception difficulties. If your building is made of concrete, steel, steel roof, copper roof, brick, aluminum siding, concrete roofing tiles, metal roofing tiles or any other signal stopping material, a repeater is usually the ideal solution for your situation. Signal outside is 3-5 bars and falls off when you enter the building. This is an indicator that the building is the problem and a repeater system will usually solve that problem by bringing that reception from the outside to cover the inside of your building.

### **5.3 Custom Applications**

Most homes or buildings are easily covered by one of our base repeater systems. Some buildings are larger or have multiple areas inside that need coverage.

You may need longer cables, more than 2 coverage antennas or other items in order to fully cover your building. We can make (almost) any cable length and can help design a system that fits your application.

### **5.4 Isolation and Separation**

Isolation refers to the proper distance or separation needed to keep the Donor antenna signal pattern and the Coverage antenna signal pattern away from each other.

Isolation becomes particularly problematic when Omni-directional antennas are used for both the Donor and the Coverage antennas. Since these antennas transmit in a circle (or more accurately a sphere) it is very easy for these spheres to overlap and thus negate the repeater system.

## **6 Production Operation**

### **6.1 Notices**

Follow below safety items carefully before installation, implementation, maintenance and operation for this product

- ① Repeater amplifies BTS uplink and downlink signal, it can extend BTS coverage area in downlink, but also effect BTS receive sensitivities in uplink.



- ① BS and MS port must be connected to donor antenna and service antenna when powers supply on; otherwise the equipment will be damage for long term use.
- ① When use repeater for outdoor, the distance between donor antenna and service antenna must be >20metes, otherwise the repeater will be damage because isolation problem for long term use.
- ① Donor antenna need to be lighting proof and lighting rod need to be install for donor antenna installation pole outside
- ① Check input power, require input power less than maximum input power of repeater, otherwise the repeater cannot work well.
- ① Keep clear for label and indicator on surface of repeater to be identified.

## 6.2 Installation

Installing a repeater system is really quite simple. The most difficult task in installing the system is running the cable and does connectors.

**Step 1:** Start by taking your phone up to the roof or other location outside to find where the signal is strongest.

**Step 2:** Temporarily mount the Donor (outside) antenna in that location. You may need to adjust and move the antenna later.

**Step 3:** Run coaxial cable into the building to a convenient location where you can also get standard 220VAC power for the repeater.

**Step 4:** Place the repeater in that location and connect the coaxial cable to the Donor Side of the repeater and the donor antenna.

**Step 5:** Mount your coverage (inside) antenna in a productive location. You may need to adjust or move the antenna later.

**Step 6:** Connect coaxial cable between the coverage antenna and the repeater output port.

**Step 7:** Power up the system and check for signal inside the building. If needed, tune system by moving and or pointing the Donor and Coverage antennas until they get the most signal possible.

**Step 8:** Secure all antennas and cables, securely mount the repeater and clean up the installation.

### 6.3 Commissioning

- ① The repeater work in indoor, the indoor condition should meet environment requirement, such as temperature, waterproof, installation space and interference source ;
- ① In order to receive right BTS signal, the antenna be directly toward to visual BTS.
- ① RF connectors should be link tighten;
- ① Repeater working power voltage **DC 5V**, power adapter transform AC 100~240V to DV 5V;
- ① Use mobile signal bars to check coverage effect on site.
- ① For dual band repeater, if one band signal is not well, you can change the donor antenna direction and check the change until it reach good coverage.